Teacher professionalisation tools for developing and arranging OER: Studying the WikiWijs portal

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ABSTRACT

Background: Wikiwijs (2009-2016) ran as national initiative by the Dutch Ministry of Education to stimulate usage of free and open digital learning material. It aimed to develop an e-learning platform where teachers (in all sectors, going from primary to tertiary education) can both search, find and assess existing as well as develop, arrange and place new digital learning materials. Our paper presents the results of studies that examined the needs and tools required by teachers that want to develop and arrange such new digital materials. It thus provides valuable input when deciding on the policy and strategy for OER (Open Educational Resources).

Method: The core of the paper is an empirical study we carried out to further determine the needs and tools for more didactical professionalisation. This type of support and existing OER will have to be provided through the 'Wikiwise professionalisation portal'.

In order to better functionally design the 'professionalisation portal' for Wikiwijs we have carried out both desk research and an additional survey study. We carried out desk research into most relevant, existing studies that (partially) dealt with this issue, and carried out another - more recent and more tailored - survey study that also questioned the *needs and preferences for using digital OER in the future*. A total of 347 teachers from various sectors filled in a structured questionnaire.

Results: We found that there is still a long way to go for schools to effectively facilitate their teachers in learning to effectively use and apply digital OER in their daily practice. In this respect, primary education schools are already making good efforts integrating professionalisation in school innovation. Besides technical support, special attention seems to be needed for 'pedagogical modelling' when teachers want to combine OER into meaningful education (e.g. continuous learning lines or curricula), an approach followed instigated by the LO (Learning Objects) movement in the past. Older and more experienced teachers seem to fall a bit behind using ICT and OER.

Keywords: teacher professionalization, Open Educational Resources, learning objects teacher needs

INTRODUCTION

On OER and its (ab)use

We assume sufficient knowledge about the basic concept of OER and its use amongst our readers, limit ourselves to a short introduction, and focus on didactic professionalisation. Open Educational Resources (OER) are learning materials that are freely available for use, arranging and redistribution. As you might know, the term OER was first adopted at a UNESCO forum in 2002 that was funded by the William and Flora Hewitt Foundation. Since 2005 we can see a marked increase in the OER movement, and from 2006 onwards we have started to realise that OER and FLOSS (Free/Libre Open Source Software) somehow belong together (source: Wikipedia, 2010).

When we look more closely at the term OER, Van Dorp et al. (2006) argue that 'Open' implies more than just providing open access to a large content base, that 'Educational' should be read as 'learning' (focusing on the learner in stead of the teacher), and that 'Resources' should go beyond merely digital content to include facilities and tools to support dialogue and collaboration (more in general learning communities). Polani (2005) notes that (Re-usable) Learning Objects in general are not clearly defined and employed in uncritical ways. To design the relation of the (abstract) LO and its (concrete) use in an instructional context (form, activity, setting, environment) where it gets meaning is essential, but often neglected. Polani states that the planning and production of OER rest on the processes of conceptualisation and collaboration. Expert OER developers should be able to develop LOs in such a fashion that they can be used for various levels of instruction, and be able to collaborate (with graphic designers, programmers, and subject experts).

As an important challenge for OER to be effectively used within the TESSA consortium (for Teacher Education in Sub-Saharan Africa) appeared to be supervisor support for teachers. Project teams concluded that regular monitoring, supervision, and reflective activities were critical to teacher development with the materials (Thakrar, Zinn & Wolfenden, 2009). Authors acknowledge that such support will have to face budgetary constraints, but are hopeful that communication technologies can be harnessed to reduce costs. Downes (2007) warns us not to think of sustainable use of OER in terms of funding, technical or content models only, but at the same time think of professionals using them. Staffing issues include volunteers and incentives, tools for professionalisation, learning communities and partnerships, co-production and sharing,

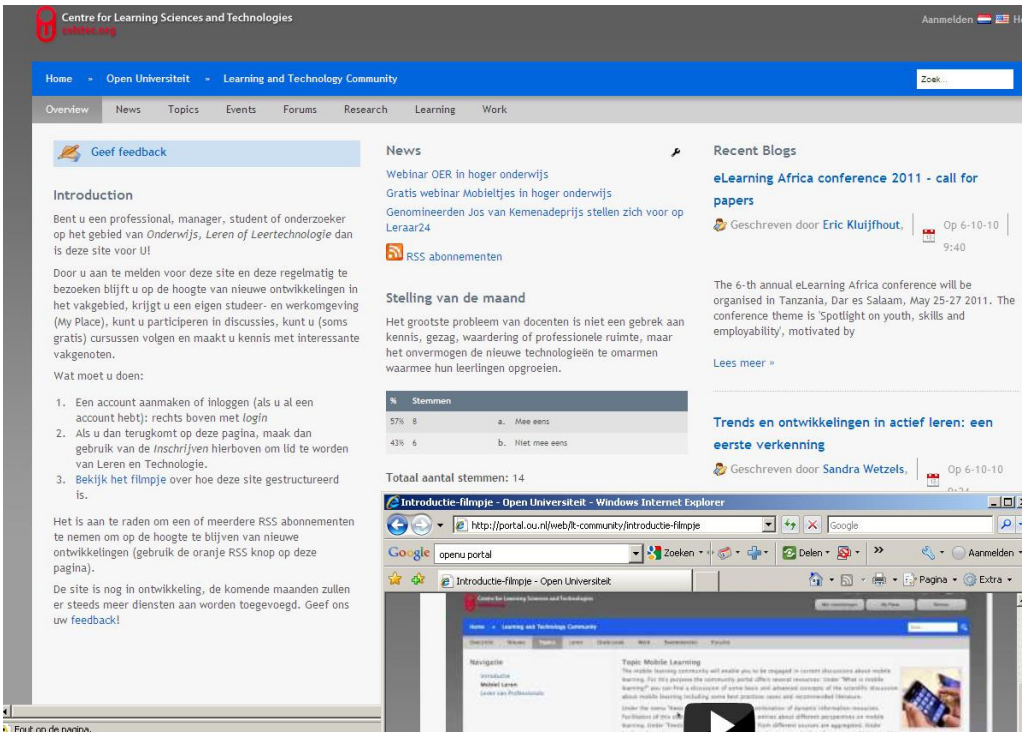
and distributed management and control. Usually the motivation for volunteers to make OER material is altruistic. In volunteer-driven OER communities two major models of organisation have emerged: the community model (where users are professionals, respected and powerful; there is more control over quality and content, but such approaches need greater levels of funding and centrality), and the emergent model (like eBay, where sole users have no power; there is little control over quality and content, but such approaches require much less funding or central management). Although centralising open educational services is less scalable / sustainable, especially for more formal education, the first (community) model seems most suitable for our purposes, that include the development of curricula with coherent 'learning lines'. In that case, adequate (didactic) professionalisation to develop and arrange OER for effective learning will have to be provided to teachers. During Spring 2008 a law was passed by the Dutch Parliament to have "schoolbooks for free". Actually, the situation before this law was that in secondary education, schools decided which books to use for the different topics and the parents had to buy them. Since the law was passed, schools received an amount per pupil for acquiring the learning materials. This gives schools the possibility to think about a policy on learning materials. Part of this policy could be to allocate part of the money to create learning materials themselves instead of buying them from commercial publishers. In reactions to this law, several persons at the OUNL responded that it would be a good idea to target part of this money for developing learning materials and publish them under an open licence.

On the OUNL and Wikiwijs

As an institute for higher education with an 'open' policy regarding freedom of access, place and pace of study, the *Open* University of the Netherlands (OUNL) has always had a keen eye for open content as well. In 2006 we launched OpenER, an extensive site offering open courses which were derived from our faculty programs. This and similar initiatives attracted over 100,000 visitors and created a first but yet thorough idea of further possibilities of OER to attract target groups that before were not reached in these volumes (Schuwer & Mulder, 2009). As another result the OUNL launched StOER (an institutional Strategy on OER) on September 2009 which can be seen as a completely new business model on the development, distribution and usage of learning materials. The main intention behind this concept is to position our institute as a frontrunner on OER by offering a portion of our materials for free (or at lower costs), and by

doing so generate more volume and revenues by addressing more and other target groups, especially life long learners. The ideas are materialized in the so called Open U portal (http://portal.ou.nl), containing the learning materials and services for registration, communication, examination, payment, et cetera (see Figure 1). Communities around several themes play a crucial role in this portal, developed using LifeRay, where exchange and co-creation of knowledge are core activities. The first communities and materials hacve become available in 2010. The potential of such communities is seen to lie in the continuous evolution of networks of persons and knowledge. It will therefore never be finished, and in that respect can be compared to the construction of the Sagrada Familia, a huge building whose final construction is decided step by step but still remains open.

Figure 1. OpenU (StOER) portal



In parallel, Dutch Parliament accepted funding of a national initiative on OER introduced by the Ministry of Education, Culture and Science in 2009. The Open University of the Netherlands and Kennisnet (a governmental organisation to realize and support IT in education for primary and secondary education and community colleges) got the assignment to implement the idea. On

December 14, 2009, the Minister of Education of the Netherlands, Ronald Plasterk, launched the first version of Wikiwijs. For this version the focus was on several subjects (language, arithmetic and math) and only primary, secondary and intermediate vocational training were supported (Schuwer and Mulder, 2010)..

The basic idea behind Wikiwijs is to create a digital, internet-based platform to bring together, share and develop digital learning materials for all educational sectors, ranging from primary education to higher education. Digital learning materials are more than digital textbooks only. It will also comprise tests and practice materials. One main principle of Wikiwijs is using the "wisdom of the crowds". Therefore, Wikiwijs should become "for, from and by teachers". As soon as possible, they must feel owner of Wikiwijs, its content and the functionality. This feeling of ownership is considered the most critical success factor for Wikiwijs. Wikiwijs will have two main functions concerning digital content:

- it will have a *repository* with open content
- it will act as a *referatory* to digital educational resources, open and closed, free access and access to be paid for, public and commercial

The collections for which Wikiwijs acts as a referatory, Wikiwijs will not have any influence on the conditions under which the content is offered. For its own repository however, Wikiwijs has chosen to use the Creative Commons Attribution license (CC-BY). This is the most open license for content. It gives users the possibility to do anything s/he wants (including commercial purposes), as long as the original authors are attributed. Table 1 presents the main goals of each project within Wikiwijs. This paper will focus on work carried out within the Professionalisation and Research & Development projects.

Table 1. *An overview of Wikiwijs goals and project.*

Content	• To get open learning materials into the repository, adequatedly tagged with metadata • To refer to existing collections (both open and closed) to improve the overview of available learning materials • To define the quality system • To define the way learning materials are made visble within a

	curriculum
Professionalisation	• Support teachers, teams of teachers and management of schools in using, creation and development of open learning materials. • Make transparant the demand of professionalisation in cooperation with teacher training institutes
Technology	• Realisation of an open, internet based platform on which teachers of all educational sectors can find, develop, make available, assess and share digital learning materials
Communities	• Existing communities are using Wikiwijs and contribute to further development of Wikiwijs • Where necessary new communities are facilitated
Research & Development	• Get insight into use and appreciation of Wikiwijs, effectiveness and efficiency of the tooling, needs for support of teachers, policy on learning materials in educational institutes • Make transparent the effect of Wikiwijs on quality of digital learning materials and, related to that, improvement of quality of teaching and professionalisation of teachers • Get insight into impediments in the field of open learning materials to develop policies on this

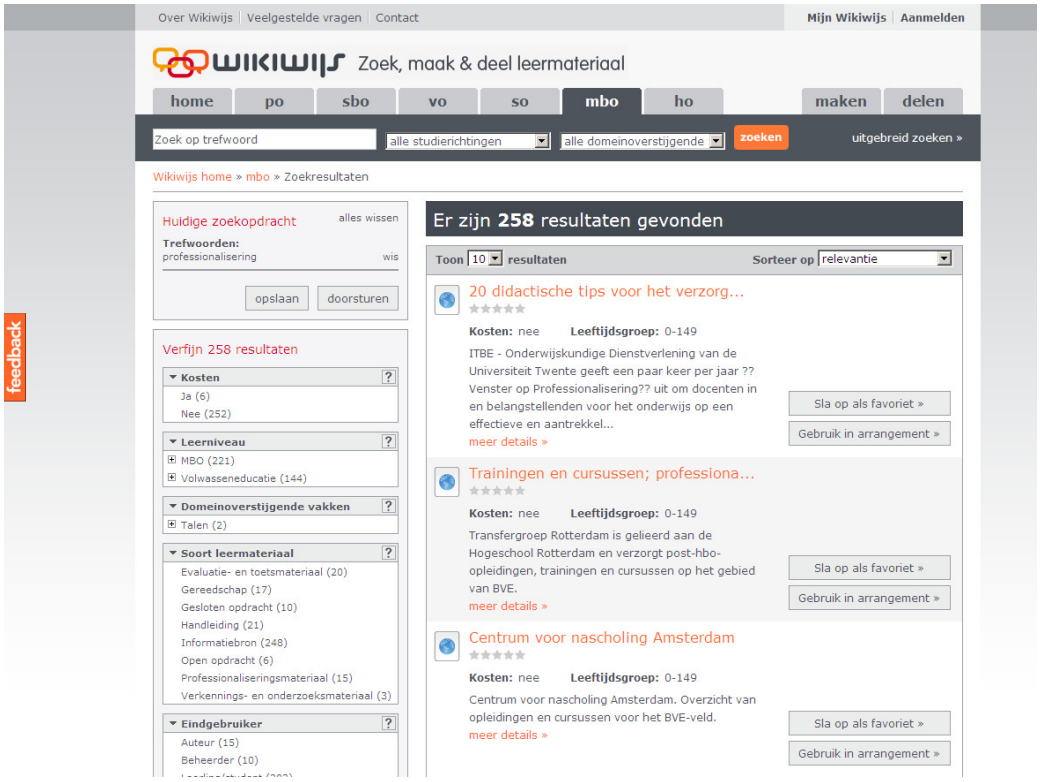
On the need for teacher professionalisation in Wikiwijs

In general, in the years to come teachers will appear to be in special need of didactical support while developing and arranging materials into new and coherent 'learning lines', especially when the role of more traditional methods (provided by educational publishers) will become outdated. What kind of support and exact tools they require still largely remains to be determined though, especially because they are unaware of potential tooling and possibilities.

The main part of the quality system for Wikiwijs are seen to be capable teachers, both in creating and in using digital learning materials. The professionalisation materials, support and facilitation services offered by Wikiwijs should contribute to this part of the quality system. Figure 2 shows a screen dump depicting various professionalisation materials available with

search criteria (like costs, learning level, type of materials, targeted end-users, and others) to find most suitable.

Figure 2. Wikiwijs Professionalisation materials



TEACHERS USING OER: NEEDS AND TOOLS

As we described in our introduction, there is general consensus that staffing and teacher professionalisation are critical factors in the successful use and development of OER. For the realization of Wikiwijs the general goal for teacher professionalisation: “Teachers should be supported and facilitated in arranging and development of learning materials. Realisation of this implies among others a help desk, training and cooperation with teacher training institutes.” This level of definition is too high to be workable for a teacher who wants to develop learning materials.

Commercial publishers bring in a lot of experience in making curriculum plans (being a translation of the high level curriculum goals of the government) and realizing this in a method. Teachers who are using these methods can be certain that their students have covered all subjects of the curriculum sufficiently.

Most teachers developing learning materials take the commercial method as a starting point. Where they think the method is not sufficient enough they will replace a little part of the method with their own materials. Examples of "not sufficient" are: not enough practice materials for the specific group of students, not topical enough, not suitable for the didactics the teacher wants to use (e.g. group learning).

More and more schools however want to replace important parts of a commercial method with their own developed learning materials. When they want to use Wikiwijs, it is necessary for each piece of learning material to know to which curriculum goal it adds. But because of the high level of the curriculum goals, it is more workable for a teacher when these goals are divided into subgoals, preferably reachable in one lesson hour. The tooling for this is however not yet available. Currently, SLO (the Netherlands Institute for Curriculum Development) is working on developing this tooling. A main part of this tooling are sets of metadata to describe the learning goals of a piece of learning materials and the connection to the curriculum goals. For some subjects these sets do exist and the coming period it will be tested on workability for the teachers.

In the context of a Professionalisation project we carried out some exploratory desk research into studies that had examined professionalisation needs of teachers using OER in the Netherlands, also to prepare an additional questionnaire survey study. We looked into other studies that appeared most relevant to answer following question: *What kind of support do teachers need when using and developing digital leaning materials?* Furthermore, based on these and other studies and documents, we drew up functional requirements for the Wikiwijs portal to offer professionalisation support (http://www.wikiwijs.nl/professionaliseren), which is currently being built and tested. Besides some general requirements, we have listed requirements to facilitate the professionalisation processes of 'searching', 'assesment and placement', 'development', and 'arranging' (Denijs, Hummel, & Jansen, 2010).

METHOD

Exploratory desk research

The most relevant studies carried out in the years 2008, 2009 and 2010 appeared to be Leermiddelenmonitor (SLO, 2007; 2008; 2009), Vier-in-balansmonitor (Kennisnet, 2007; 2008; 2009), Nascholingsbehoeften (Teleac/Leraar24, 2009), and Nulmeting Onderzoek (Wikiwijs, 2009). The latter was meant as a baseline study for the Wikiwijs project.

Large numbers of respondents (both management and teachers; both primary, secondary and vocational education) filled in the online questionnaires at the end of the years mentioned: Leermiddelenmonitor 2008 (N=1750), Vier-in-Balansmonitor 2008 (N=1022), Nascholingsbehoeften 2008 (N=1100). Of these respondents an average of 75% were teachers (with an average of 0 years of teaching experience), and the average ratio of primary: secondary education was found to be 70:30.

Main results from analyzing the reports of the studies were that teachers are in need of more effective support when arranging OER into coherent and (didactically) meaningful 'learning lines' that aim at the accomplishment of curricular goals. In their daily work teachers find it hard to find, select and implement the most adequate (often rather basic) ICT tools and OER in a more coherent and structured way. Furthermore, the findability and usability of existing OER needs to be improved. Teachers especially need material that is easily accessible, flexible / adjustable and offer an 'enrichment' to available (commercial) methods. This enrichment can be manifested in the interactivity or dynamics (not merely textual content), possibilities for differentiation, in the actuality of the publication (methods become outdated), the remedial or diagnostic capacities, integrative qualities, or other 'unique selling points' (Van Amersfoort, Van Buuren & Hummel, 2010). Existing studies had a rather broad scope, addressing various topics and contexts for professionalisation needs in the present. For the Wikiwijs project we needed to carry out a more focused study, and also address teacher needs when using and arranging digital learning materials *in the future*. Simple descriptive statistics (averages) en simple factor analysis (ANOVA) were used to analyse the data.

Additional questionnaire survey

The nascholingsbehoeften (Teleac/Leraar24, 2009) study could later be followed up in the context of the Wikiwijs project. In order to answer the previously posed question, a structured questionnaire was constructed to collect data about future professionalisation needs and preferences. In the context of the Wikiwijs project, this survey (De Bie & Münstermann, 2010) was carried out amongst a rather large group (N= 347) of teachers that work in various sectors of education. The questions dealt with future professionalisation and training needs in general, but also contained items more specifically focused on using OER and ICT. Most questionnaire items had to be scored on a 5-point Likert scale, going form 'strongly disagree' (score of 1) to 'strongly

agree' (score of 5), thus with a (neutral) middle point score of 3. The largest portions of teachers worked in primary education (n=110; 32%) and secondary education (n=93; 27%). The average age was around 43 years (the 40-50 years age group was over represented), and the average amount of teaching experience was around 20 years. In our results section we will restrict ourselves to the items pertaining to the latter, more specific field of professionalisation related to OER and ICT. Again, simple descriptive statistics (averages) en simple factor analysis (ANOVA) were used to analyse the data.

RESULTS

Exploratory desk research

Main results from the Leermiddelenmonitor (SLO, 2007; 2008; 2009) studies show that teachers first of all need support in developing learning materials and selecting adequate ICT-tools. Other interesting findings were that:

- Average sustainability of methods in PE is around 9 years, while this time for SE is about 5,5 years
- Most important reasons for wanting to use OER that were mentioned were updating the content en didactics (80%), better alignment with experiences of learners (80%), and better integration of learning domains (50%)
- Education stressing the importance of active learning use more method-independent learning materials (like OER) than education that still is more teacher-oriented.
- Especially in the first classes of PE teachers are inclined to work largely (72%) independent of (commercial) methods, which will become less common (46%) in later years.
- Teachers state that it is hardest to take care of integration with other topics, learning goals and 'learning lines'

Main results from Vier-in-balansmonitor (Kennisnet, 2007; 2008; 2009) show a deep felt need to learn more about digital didactics, using electronic learning environments, and to acquire more media literacy and information skills (esp. searching on the internet). It was found that most schools now do have a policy plan for using new media (ICT) which often is not used or executed in actual practice. Very specific needs mentioned were learning materials to work with digital whiteboards and online help for disfunctioning technologies.

Main results from the Wikiwijs nulmeting (2010) show that

- The usage of digital learning material is growing and currently highest in MBO (secondary vocational education) (32%), and lowest in SE (secondary education) (18%).
- About 40% of teachers indicate to never have used or developed digital learning material
- Older teachers face more anxiety and are more reluctant to use digital learning materials, however this appears to be less for those who work more hours weekly
- Female teachers are more inclined to use existing digital learning materials, male teachers are more inclined to develop and arrange new digital learning materials
- The general attitude towards using and arranging digital OER is most positive in PE (Primary education)

Main results from analyzing the reports of the studies were that teachers are in need of more effective support when arranging OER into coherent and (didactically) meaningful 'learning lines' that aim at the accomplishment of curricular goals. In their daily work teachers find it hard to find, select and implement the most adequate (often rather basic) ICT tools and OER in a more coherent and structured way. Furthermore, the findability and usability of existing OER needs to be improved. Teachers especially need material that is easily accessible, flexible / adjustable and offer an 'enrichment' to available (commercial) methods. This enrichment can be manifested in the interactivity or dynamics (not merely textual content), possibilities for differentiation, in the actuality of the publication (methods become outdated), the remedial or diagnostic capacities, integrative qualities, or other 'unique selling points' (Van Amersfoort, Van Buuren & Hummel, 2010).

Additional questionnaire survey

A first interesting observation is that age plays an important role in teacher needs. Where young teachers (21-30 years; n = 58) do not score the importance of becoming more competent on the domain of didactics and ICT that high ($M = 2.66$; $SD = 1.18$), somewhat older teachers (41-50 years; n=118) score this importance higher ($M = 3.25$; $SD = 1.22$). Over all age groups (21-30; 31-40; 41-50; 51-60; and 60+) this age effect was found to be highly significant (F (1, 346) = 1.952, $p < 0.001$).

A second interesting finding was that experience plays an important role in teacher needs for getting access to online learning materials, with older teachers experiencing more need for

adequate professionalisation in using digital learning materials, an effect that across these same age groups was also found to be significant (F (1, 346) = 2.84, p = 0.02).

Most teachers indicate that professionalisation first of all has to deal with updating their knowledge on subject matter (M = 3.59, SD = 1.19) and with strengthening their educational practice (M = 3.99, SD = 0.97) in general, t.i. independent of using ICT. At the same time they also indicate a preference for knowing more about educational innovation. Questionnaire items that especially dealt with educational innovation, using ICT, and applying didactics when using ICT, are listed in Table 2.

Table 2. *Questionnaire Items related to digital learning media (N=347)*

Questionnaire Item	*M*	*SD*
I prefer when professionalisation deals with applying educational innovations	3.53	1.10
Professionalisation has to allow me to play a key role in educational innovation	3.43	1.21
I would like to become more competent with ICT and the didactics of ICT-applications	3.09	1.21
I need to become more professional in using ICT	2.97	1.25
I prefer professionalisation activities related to distance education, allowing me to determine time and place	3.64	1.15
An important factor for effective professionalisation for me is to have access to online materials	4.25	0.85

CONCLUSIONS AND DISCUSSION

We have established that developing education with OER is a process that involves learners, teachers and sets of educational resources, that all need to be arranged in some structured way. Building a database and community around such OER is a very open process in itself also. This means that this process will never end, and that the final outcomes and results (like a professionalisation portal) cannot be completely designed or determined in advance. In this respect a teacher professionalisation portal around OER and ICT can be compared with the construction of the Sagrada Familia, u huge building which evolution has been determined step

by step. Most importantly, although it is still under construction, there is already a lot going on. There are needs and preferences to have to be (and will be) taken into account though.

Many authors have acknowledged (see also McGreal, 2006, Lane & McAndrew, 2010) that there is a need to distinguish technical and pedagogical aspects when using OER, at the same time emphasizing that their pedagogic value is most important. Concrete answers as to how teachers should use OER for online education have remained scarce so far. We have further established that teachers need to be professionalised in a pedagogical way in order to successfully develop new and arrange old OER, addressing a previous lack of professional development linked to teaching and raising a need to share practice. We have observed that teachers typically work alone in constructing and delivering their teaching experiences. They work with the content they best know from their own experiences or feel able to easily construct themselves and use the tools they are most familiar with. However, with OER teachers have to learn to find and use in greater depth the learning and teaching experiences of others to inform their own praxis, and to co-create (or remix) greater volumes of such materials with colleagues around the world.

We found that especially older and more experienced teachers seem to be in need of professionalisation in learning to use digital learning materials, and need to learn how to get access to them. This may point to a backdrop in experience with and knowledge of digital OER. Support, recognition and facilitation seem to be most important components that teachers hope to find at school in order to become more professional. However, the teachers that were questioned value this support and facilitation at their schools as poor to moderate. Although some courses are being offered, there is hardly or no systematic attention for professionalisation nor is there much opportunity for sharing experiences and knowledge. Apparently schools do not yet master to relate the professionalisation of its staff to schoolinnovation, one of the pillars of integral personel policies (IPB). A general reluctance to change is generally seen as a ‘soft’ but powerful cause of this stagnation. More and more primary education schools in the Netherlands are becoming positive exceptions, with active policies on teacher professionalisation with teachers actually applying what is learnt in daily practice.

We have further learned that OER developments (starting from the premise of how to make content more open and portable in general) so far were not linked to learning object (LO) approaches (thinking about how to design ‘better’ courses). We conclude that the OER movement has to take aboard what the LO movement did before, that is to help teachers (rather

than other users). There are many different aspects to a learning design where consideration has to be given to all didactical elements (content, activities, assessments) and their configuration to meet clearly set learning objectives or learning outcomes. Pedagogical professionality builds upon representation knowledge, for instance about matching OER to group size, assessment and additional support. A good example is the use of standards, especially for metadata and learning design (or educational modelling) – ways of thinking about constructing courses or educational activity using a variety of resources. One of the most developed learning design representations is IMS Learning Design (Koper, 2003).

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